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(54) Arrangement for Preventing Contact Corrosion in  
Magnesium Wheels

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Notice: This application is as filed and may therefore contain an  
incomplete specification.



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TEXT TRANSLATION

Arrangement for preventing contact corrosion in the case of magnesium wheels

The invention relates to an arrangement for preventing contact corrosion in the fixing of a magnesium wheel to the wheel mount of a motor vehicle.

In expensive passenger motor vehicles, the wheels carrying the tyres are increasingly being made of light metal in order to reduce the weight of the unsprung mass and thus to improve travel comfort. For wheels of this type, aluminium has been the material mainly used hitherto. An even lighter weight and thus a further reduction in the unsprung mass is achieved if magnesium is used for these wheels.

Wheels of this type are conventionally screwed firmly to the wheel mounts of the vehicle axles, the wheel supports consisting of steel or cast steel.

However, the direct contact of magnesium and steel can lead to what is known as contact corrosion, which can permanently damage the metal crystalline structure of the magnesium wheel, thus reducing the service life of such a magnesium wheel.

The object of the present invention is therefore to create an arrangement whereby direct contact between magnesium and steel is avoided, without in any way limiting the strength of the connection between the magnesium wheel and the wheel mount on the vehicle.

To achieve this object, it is proposed according to the invention that an annular, aluminium washer is inserted between the inner contact face of the magnesium wheel and the wheel mounting face, in the region of the fixing bores, and that as a centring means an annular, plastics adapter is squeezed into the hub bore of the magnesium wheel, covering

the radially inner circumferential face of the washer and centring same.

With this interposition of an aluminium washer between the magnesium wheel and the steel wheel mount in the region of substantial pressure, direct contact between magnesium and steel is avoided, as contact corrosion between magnesium and aluminium and aluminium and steel is virtually non-existent. The remaining, non-stressed contact areas between the magnesium wheel and the wheel mount are separated by plastics parts having sufficient pressure resistance.

It is advantageous in this case if the washer has axially parallel bores corresponding to the fixing bores of the magnesium wheel and an inner circumferential face which tapers conically towards the magnesium wheel and on which the correspondingly conically widening outer circumferential face of the plastics adapter bears.

It is also advantageous if at least one of the bores in the washer has on its contact side with the magnesium wheel a countersinking depression, and that a centring bush with a centrally, radially projecting collar is so inserted into said bore that the collar completely fills the depression and is flush with the plane face of the washer.

The plastics adapter itself may have a cylindrical section with a plurality of axially punched locking lugs and an adjoining section conically widening on the inner and outer circumference with inner diameters corresponding to the outer diameter of the centring attachment of the wheel mount.

To fix the adapter to the magnesium wheel, it is advantageous if the hub bore of the wheel has a radial widening into which the locking lugs of the adapter can engage.

Advantageously the plastics adapter consists of glass-reinforced nylon, the same material from which the centring bush is made.

The centring bush advantageously has a slightly larger inner diameter than the outer diameter of the fixing screws, and an outer diameter corresponding to the bore diameters in the washer and the magnesium wheel for the fixing screws in order to permit exact alignment of the washer with the magnesium wheel.

The aluminium washer itself should have a thickness of approximately 3 to 5 mm.

The structure and mode of operation of an embodiment according to the invention are explained in more detail by means of a diagrammatic drawing, in which:

Fig. 1 shows a longitudinal section through a fully mounted magnesium wheel,

Fig. 2, an exploded view in perspective of the adapter, washer and centring bush, and

Fig. 3, an enlarged partial section through the magnesium wheel in the region of a fixing screw.

Fig. 1 first of all shows a cross-section through a magnesium disc wheel 1 with a hub 2, spokes 3 and rim well 4 for receiving the tyre, which is not shown. This magnesium wheel is connected in the region of the hub 2 via corresponding screws 5 to the wheel mount 6, shown in broken lines, on the outside relative to the brake disc 7, also shown in broken lines. Between the magnesium wheel 1 and the wheel mount 6, in the region of the screws 5, an annular aluminium washer 10 is disposed, which is radially centred

on the inside relative to a plastics adapter 11 clamped into the hub bore 8.

In Fig. 2, the individual parts for preventing contact corrosion are shown again, in an exploded, perspective view, their cross-sections being shown individually in the enlarged partial cross-section according to Fig. 3. As can be seen from Fig. 2, the aluminium washer 10 has five coaxial bores 12, which are flush with the corresponding bores in the hub for the fixing screws. For insertion into one of these bores 12, the centring bush 13 is provided, whose function will be described below.

The plastics adapter 11 has in the rear cylindrical region 15 four punched locking lugs 16 to lock into the wheel hub.

As can be also seen from the enlarged cross section in Fig. 3, the aluminium washer 10 inserted between the hub 2 of the magnesium wheel 1 and the wheel mount 6 has bores 12 whose diameter corresponds exactly to the bores 17 in the wheel hub 2.

Into one of the bores 12 in the washer 10, a cylindrical centring bush 13 is inserted, which has in its centre a radially projecting collar 14, which engages in a depression 18 on the wheel-side end face of the washer 10. This centring bush 13 is thus held in the washer 10 and extends into the bore 17 of the wheel hub 2 in order to align the washer 10 precisely.

The inner circumference of the washer 10 has a circumferential face 20 which tapers conically towards the magnesium wheel 1 and on which the correspondingly conically widening outer circumferential face 21 of the plastics adapter 11 bears. This plastics adapter 11 projects with its cylindrical region 15 into the hub bore 8 and has - as

can be seen in particular from the perspective view according to Fig. 2 - slightly elongate locking lugs 16 which are punched out of the cylindrical region 15 and which engage in a radial widening 22 in the hub bore 8.

The plastics adapter 11 rests with its inner diameter 23 exactly over the outer circumference of the centring projection 24 (shown in broken lines) of the wheel mount 6.

The assembly of the individual parts, washer 10 and adapter 11 on the magnesium wheel 1 is advantageously carried out as follows: First the centring bush 13 is inserted into the bore 12 of the washer 10 having the depression 18 in such a manner that the collar 14 does not project above the plane face 25 of the washer 10.

Then the magnesium wheel 1 is laid on the ground with its visible side at the bottom, and the centring bush 13 together with the washer 10 are inserted into one of the bores 17 in the wheel hub 2. Then the washer 10 is rotated until all the bores 12 in the washer 10 are aligned with the bores 17 in the hub 2.

Then the plastics adapter 11 is pushed through the central aperture 20 in the washer 10 until the locking lugs 16 audibly engage in the hub bore 8. This then ensures precise centring and mounting of the washer 10 relative to the magnesium wheel 1. Then titanium conical collar screws 5 are inserted from the outside of the magnesium wheel 1 via widened blind bores 26 and the wheel 1 is screwed therewith to the wheel mount 6.

The washer 10 advantageously has a thickness of approximately 3 to 5 mm and is made of pressure-resistant aluminium, which has no contact corrosion with the magnesium of the wheel or the steel of the wheel mount.

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The adapter 11 is advantageously made of glass-reinforced nylon and is therefore also very strong. The centring bush 13 may also be manufactured from the same material.

With the described arrangement and the correspondingly formed parts, it is possible to prevent, simply and reliably, contact corrosion with the steel wheel mount when a magnesium disc wheel is used, as all possible contact faces are separated by aluminium in the pressure region and plastics material in the purely positively locking region.

## Claims

1. Arrangement for preventing contact corrosion in the fixing of a magnesium wheel to the wheel mount of a motor vehicle, characterised in that an annular, aluminium washer (10) is inserted between the inner contact face of the magnesium wheel (1) and the wheel mounting face (6), in the region of the fixing bores (17), and that as a centring means an annular, plastics adapter (11) is squeezed into the hub bore (8) of the magnesium wheel (1), covering the radially inner circumferential face (20) of the washer (10) and centring same.
2. Arrangement according to claim 1, characterised in that the washer (10) has axially parallel bores (12) corresponding to the fixing bores (17) of the magnesium wheel (1) and an inner circumferential face (20) which tapers conically towards the magnesium wheel (1) and on which the correspondingly conically widening outer circumferential face (21) of the plastics adapter (11) bears.
3. Arrangement according to claim 2, characterised in that at least one of the bores (12) in the washer (10) has on its contact side (25) with the magnesium wheel (1) a countersunk depression (18), and in that a centring bush (13) with a centrally, radially projecting collar (14) is so inserted into said bore that the collar (14) completely fills the depression (18) and is flush with the plane face (25) of the washer (10).
4. Arrangement according to claim 1 and 2, characterised in that the plastics adapter (11) has a cylindrical section (15) with a plurality of axially punched locking lugs (16) and an adjoining section conically

widening on the inner and outer circumference with inner diameters (23) corresponding to the outer diameter of the centring attachment (24) of the wheel mount (6).

5. Arrangement according to claim 4, characterised in that the hub bore (8) of the magnesium wheel (1) is provided with a radial widening (22) in which the locking lugs (16) of the adapter (11) engage.
6. Arrangement according to claim 4, characterised in that the plastics adapter (11) consists of glass fibre-reinforced nylon.
7. Arrangement according to claim 1, characterised in that the aluminium washer (10) has a thickness of approximately 3 to 5 mm.
8. Arrangement according to claim 3, characterised in that the centring bush (13) advantageously has a slightly larger inner diameter than the outer diameter of the fixing screws (5), and an outer diameter corresponding to the bore diameters (12, 17) in the washer (10) and the magnesium wheel (1) for the fixing screws (5).

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**Abstract**

To prevent contact corrosion when a magnesium wheel is fixed to the wheel mount of a motor vehicle, an arrangement is provided in which, according to the invention, an annular aluminium washer (10) is inserted between the inner contact face of the magnesium wheel (1) and the wheel mount (6) in the region of the fixing bores (17), and as a central centring means an annular plastics adapter (11) is squeezed into the hub bore (8) of the magnesium wheel (1) in order to cover the radially inner circumferential face (20) of the washer (10) and to centre same (Fig. 1).

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Fig.1

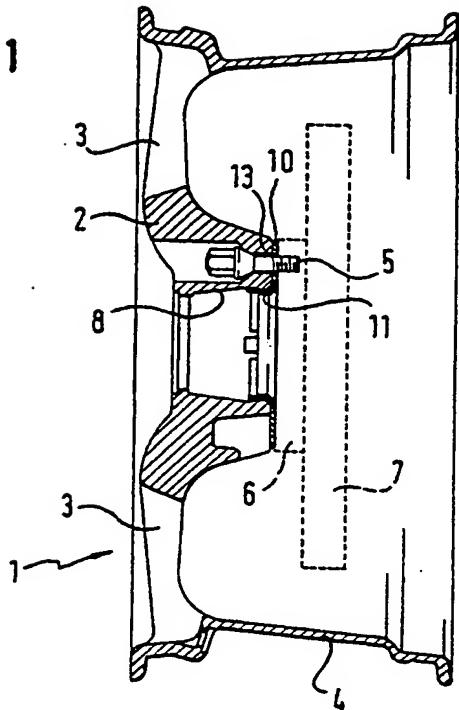
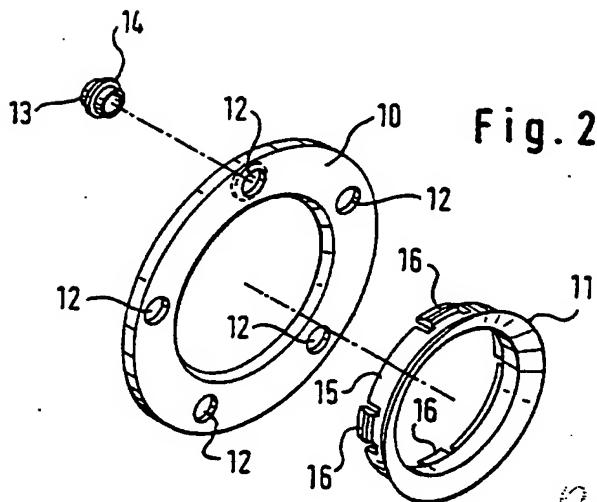
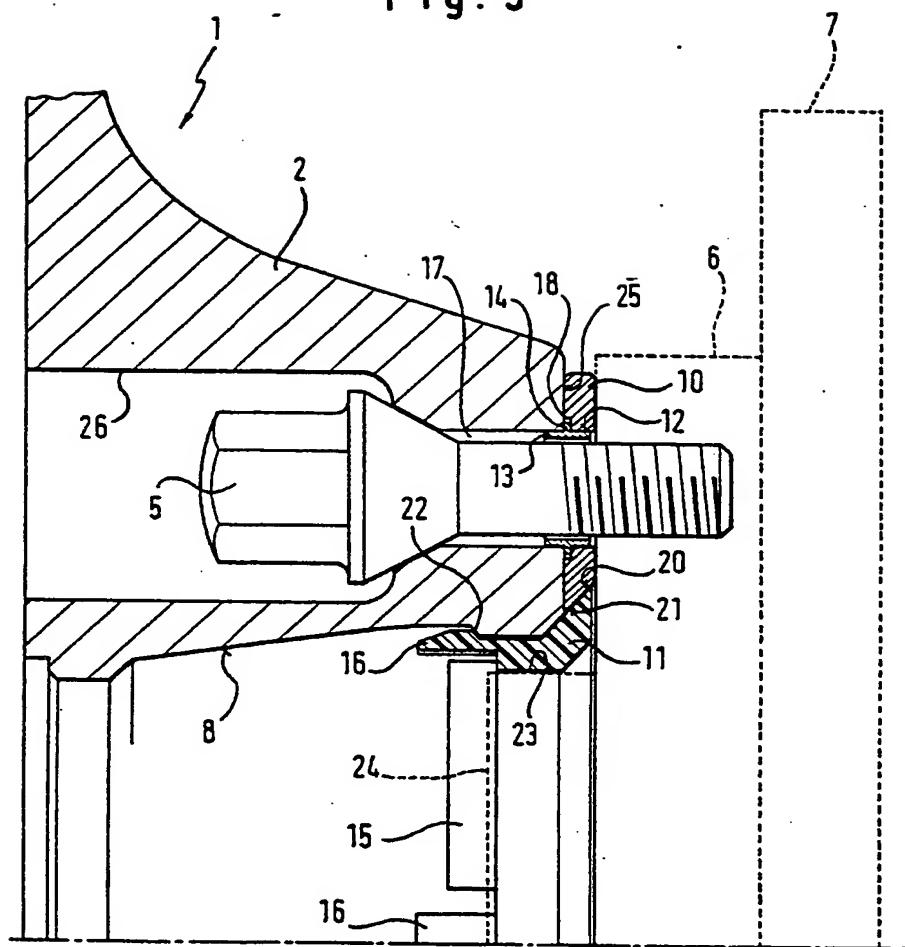


Fig. 2



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Fig. 3



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